

48881US HKS:LR

**Declaration**

I, MALCOLM BARRY JAMES do solemnly and sincerely declare the following:

1. THAT I am the inventor of the invention claimed in US patent application 07/719136 entitled 'Temperature Control Method and Apparatus'.
2. THAT I have for more than 20 years been a specialist designer of plastic molds and including plastic injection molds.
3. THAT as a professional mold designer, I have experienced the problems associated with the cooling of molds for many years and have been enormously frustrated that there was no good answer to the problem of keeping the temperature throughout a mold relatively uniform and in so doing, keeping that temperature within an appropriate operating range.
4. THAT I was not aware of any comprehensive solution to this problem that existed anywhere in the world and I can say this because, as a part of my professional expertise, I have to and indeed do keep up to date with technologies that are available in various countries.
5. THAT I am aware of the objection to the patent application based upon the United States patent specification Cavazos US5167688.
6. THAT I have very carefully considered Cavazos as to whether this description would provide me, as a specialist in the field, with a solution to the problem that I was facing when I invented my concept.
7. THE first issue is of course that Cavazos is dealing with a mold for glass which necessarily operates at a much higher temperature than one would use for molding plastics materials.

8. A mold for plastic materials typically operates with surface temperatures of less than 65° Centigrade and there are generally a number of problems associated with plastics materials where uniformity of temperature is important.
9. WHEN I first considered my concept, I was not certain that it would work effectively so I constructed an experimental mold which incorporated viewing panels that allowed me to observe the action of the system under simulated operating conditions and which also allowed me to conduct experiments to determine the relative importance of various structural factors to the effectiveness of the concept.
10. THIS developmental work proved the importance of working with a shaped chamber within the mold that provides similar distances for heat to travel from all points on the working surfaces of the mold to the surfaces of that chamber and which reliably provides for the return of liquid from the condenser to those working surfaces within the chamber.
11. AS the liquid absorbs heat, and since very low pressures are involved, comparatively large volumes of vapor are created very quickly, causing a violent boiling effect which very easily drives all of the liquid to the top of the chamber where, as I said, the design of the chamber must allow for the liquid to return to the bottom of the chamber so that the process can be continuous.
12. THE problems with Cavazos are firstly that there appears to be no way that liquid can be returned to the areas from which heat is to be taken after its initial expulsion by the boiling action and secondly that no attempt is made to create uniform flow paths between the molding surfaces and the cooling system so that even if Cavazos had made effective use of the phase change properties of the liquid, he still does not address the problem of uniform distribution of its effect.
13. WITH Cavazos, any liquid that attempts to return would be boiled off before it did so and as the resultant vapor rises through the conduits it blocks any flow of liquid back into the bores (as occurs in the conduit of a coffee percolator).
14. THAT when I was attempting to find a solution to the problems associated with mold cooling, I independently considered and rejected a number of concepts based on the 'heat pipe' principle, including concepts similar to that described by Cavazos and had I

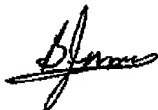
then been aware of Cavazos and accepted his teaching I am confident that I would have been in fact deflected from finding the solution that I have found.

15. THE reason I would have been deflected is that clearly Cavazos had been attempting to keep a mold cool and had specified the use of straight bores in the actual mold, narrow conduits that were fed to a common manifold and then a quite complex process of controlling the excessive temperatures by controlling the pressures.
16. FURTHER, as Cavazos shows the system half full of water, one has to assume that this is the operating condition but, like in a coffee percolator, vapor rising in a conduit prevents water from returning via that conduit.
17. IN my considered careful opinion, Cavazos does not teach me an enabling concept of process that would in any way be beneficial to the problems presented and indeed solved by my invention.
18. IF anything, it would have been a negative teaching in that he says near the beginning of his patent that he found that with his system "the most efficient cooling is when the heat of the mold is transferred not to a liquid, but to a vapor which is in contact with the walls of the plurality of blind bores" so clearly by his own words he does not teach an effective method for the use of the phase change properties of a liquid and I am aware that the use of water vapor as a conductor of heat is far too inefficient to be useful in a mold which processes thermoplastics.

AND I make this my declaration solemnly and sincerely believing the same to be true.

Dated this Nineteenth day of December 2003

Signed:



MALCOLM BARRY JAMES